# NCSS Conference Standards Committee – 2009

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# Benchmark Soils

- Result of our NCSS committee Discussions.

## 630.00 Definition and Purpose.

### (a) Definition.

A benchmark soil is one of large extent within one or more major land resource areas, one that holds a key position in the soil classification system, one for which there is a large amount of data, one that has special importance to one or more significant land uses, or one that is of significant ecological importance.

**630.01 Policy and Responsibilities.**

**(a) The MLRA Soil Survey Office (MLRA-SSO) is responsible for:**

- through cooperation and consultation with the technical team members, evaluating the benchmark soils in their area of responsibility for adherence to the benchmark soils definition and purpose.
- proposing changes to the benchmark soils status of soil series through the MLRA Management Team to the MLRA Soil Survey Regional Office.
- identifying soil series that are considered similar to the benchmark soils for the extrapolation and transfer of data.
- ensuring pedon descriptions are in NASIS pedon for benchmark soil sampling sites.
- Including a focus on benchmark soils in long range, project and investigation plans.
- developing an inventory of existing data for benchmark soils within their area of responsibility. assessing the adequacy of the data ,and developing plans to fill identified data gaps
- developing a narrative record for each benchmark soil within their area of responsibility.

**(b) The MLRA Soil Survey Regional Office (MO) is responsible for:**

- maintaining the benchmark status data element for soil series in the soil classification database,
- assuring that benchmark soils are adequately addressed in MLRA-SSO long range, project, and investigation plans,
- assuring the entire MLRA is adequately represented by an optimal number of benchmark soils by approving/denying recommendations for changes to benchmark soil status,
- maintaining an inventory of existing data for benchmark soils, as supplied by each MLRA-SSO, for their region,
- consulting with appropriate members of MLRA Management Teams with regard to requests for revisions to benchmark status, and
- focusing long-range soil survey investigation plans on benchmark soils and their characteristics.

**(c) The state soil scientist is responsible for:**

- reviewing proposed changes, as a member of a MLRA management team, to the benchmark status of soil series, and forwarding those that the management team concurs with to the MO for approval,
- soliciting input from cooperators and interdisciplinary specialists in the selection of benchmark soils, and
- ensuring that benchmark soils are considered in organizing and planning research, special studies and investigations

**(a) Criteria.**

- The soil series that are designated as benchmark soils within an MLRA should collectively reflect the major diversity of soils within the area. The criteria are:

  **(1) Extent**. The soil series that are selected as benchmark soils are commonly of large extent (>100,000 acres) in the Land Resource Region (LRR), and of moderate or large extent in the major land resource area (> 10,000 acres). Not all series of moderate or large extent are benchmark soils. Generally, the combined total extent of all benchmark soils should comprise about 20 to 25 percent of the total soil area of the major land resource area. When combining the extent of the benchmark soils plus the extent of similar soils that they represent, collectively they are representative of 60 to 80 percent of all soils in the major land resource area. This kind of representation ensures that any collected data are widely applicable.

# Criteria Continued

- **(2) Key Taxonomic Classes.** Soils that are representative of key positions in soil taxonomy within the MLRA (such as commonly occurring great groups or subgroups) are considered for benchmark soil designation. Research on these can be easily applied to other soils in those classes. Typically no more than one or two soils from the same family are designated as benchmark soils within an MLRA. (See item 4 below for a reason to have more than one.)

# Criteria Continued

- **(3) Existing data.** When similar soils are potential candidates for benchmark soil designation, soil series for which there are adequate amounts of data have preference over equally suitable series for which there are less data. Data-completeness of correlated pedon data must be evaluated concurrently with analyses of series extent, taxonomic significance, or unique importance. The national soil characterization database, maintained by the National Soil Survey Center, includes laboratory data for benchmark soils. In addition, soil survey investigations reports identify benchmark soils. This will optimize the identification of potential benchmark candidates.
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# Criteria Continued (description of data completeness)

- Benchmark soils need to be well documented with complete characterization data. Ideally, there should be 3 to 5 pedons characterized. Each description must be accurately georeferenced. The data should include physical characterization (e.g. particle-size, bulk density, moisture characteristics, Atterberg limits, etc), chemical characterization (e.g. pH, base status, CEC, organic carbon, and calcium carbonate equivalent as applicable, etc), and mineralogical characterization (e.g., clay minerals, grain counts). Additional data such as cations extracted by ammonium oxalate, cations extracted by dithionate citrate, electrical conductivity, COLE, phosphate retention, exchangeable sodium percentage, melanic index, or other properties are important for some soils and should be considered when evaluating the completeness of existing data. Since there is not a single list of appropriate data for every soil, the assigned liaison from the Soil Survey Laboratory, and where applicable, local university NCSS cooperator, should be consulted in evaluating the adequacy of existing data for benchmark soils, identifying data needs, and developing plans to expand the data available for benchmark soils in the region.

# Criteria Continued

**(4) Other considerations.** The set of benchmark soils for a MLRA should include representatives from the major parent materials and landforms in the area. For example, coarse-loamy, mixed, mesic, active, Typic Hapludalfs may be common on both extensive glacial till plains and alluvial stream terraces in the MLRA. A single series from this family might not be adequate to represent these conditions if some key properties are significantly different between the two settings.

Certain soils are especially important because of their use or ecological importance in the landscape. If these soils are essential to the understanding of landscape processes or ecological functions within the MLRA, or interpretations for unique land uses or land management practices, they may be designated as benchmark soils, even if they are not extensive. The number of soils meeting this criterion alone is small, perhaps two or three per MLRA.

**General Guidance.**

Using the criteria discussed above, select the fewest number of soils required to adequately represent the soils in the MLRA . By considering extent, taxonomic placement, ecological significance, major parent materials and landforms, uniquely important soils, and existing data, an optimal benchmark soil list can be developed.